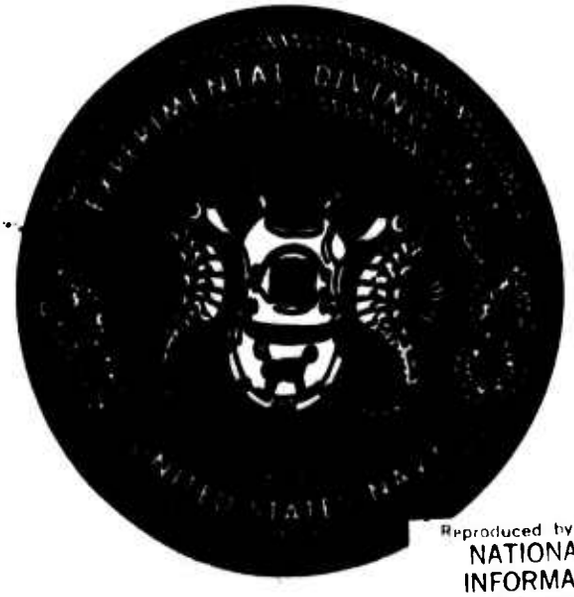
COMPARATIVE EVALUATION OF THREE COMMERCIALLY AVAILABLE SWISS-MADE SUBMERSIBLE WRIST WATCHES

C. M. Prickett, et al

Navy Experimental Diving Unit
Washington, D.C.

15 July 1958

NAVY EXPERIMENTAL DIVING UNIT



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13 ABSTRACT

Three commercially available, Swiss made, submersible wrist watches, Rolex, Blancpain and Unicar, are comparatively evaluated and in turn are compared with the still-under-development standard USN watch (Bulova). Specific features of the Swiss watches (stem and second hand) are recommended for inclusion in the USN watch. The Rolex watch is found to be not sufficiently waterproof, bearing out reports from the field and is recommended for deletion from the Navy's approved list. The very cheap, but without rotatable ring, Unicar watch is found to be satisfactory, again bearing out reports from the field, and its inclusion on the approved list is recommended.

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U. S. NAVAL GUN FACTORY
WASHINGTON, D.C.

EVALUATION REPORT 1-59

COMPARATIVE EVALUATION OF THREE COMMERCIALLY AVAILABLE, SWISS-MADE SUBMERSIBLE WRIST WATCHES

PROJECT NS 186-200 SUBTASK 4 TEST 43

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15 July 1958

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U. S. NAVY EXPERIMENTAL DIVING UNIT
U. S. NAVAL GUN FACTORY
WASHINGTON, D. C.

ADDENDUM

15 October 1958

Limited

Subj: Addendum to Experimental Diving Unit Evaluation Report 01-59, "An Evaluation of an Exhaust Muffler for Open Circuit Scuba developed by the U.S. Navy Mine Defense Laboratory".

1. Subsequent to completion and approval of the subject report, a report of additional field trials of the Mine Defense Laboratory Muffler by EODTC at NOLTF, Ft. Lauderdale was received. Since the results of these trials have a bearing on the subject report, pertinent excerpts from the report along with amplifying remarks from an interview with the cognizant officer supervising the trials are recorded here as an addendum to the basic report.

2. Excerpts from EODTC Confidential report 017 T & E dated 15 September 1958, "Summary of the second preliminary test conducted at NOLTF, Fort Lauderdale, Florida on the acoustic measurements of diving equipment and disarming procedures for a disposal man in attempting to render safe acoustic sea mines" follow (excerpts from the first test are included as Appendix D of Evaluation Report 01-59):

"4. The following scuba equipment was used on the monitored hydrophones and acoustic mine tests.

a. Northill Air-Lung and regulator

b. Scott Hydro-Pac Model No. 8490

c. Aqua-Lung with exhaust muffler developed by Mine Defense Laboratory

d. British Clearance Divers Breathing Apparatus (CDBA). One set with standard relief valve. One with special relief valve developed by EDU.

e. Aqua-Lung (U.S. Navy standard non-magnetic 3000 psi bottles)

"6. Because the Aqua-Lung with muffler is a new development for mine clearance diving, some of the physiological problems experienced while on these tests are herein noted.

a. Anytime a diver gets behind in breathing, he will experience difficulty unless he exhausts out the side of his mouth by-passing the mouthpiece.

b. Most divers will exhaust around the mouthpiece rather than expend the additional effort required to exhaust through the muffler, thus defeating the purpose of the muffler.

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c. Once the muffler fills with water, say through a faulty regulator, it is very difficult to clear.

d. A total of twenty-nine (29) dives were made while using the muffler and on two occasions, divers were forced to surface after experiencing one or more of those conditions as noted above.

"8. Conclusions:

d. The Aqua-Lung Muffler is a definite improvement over the regular Aqua-Lung without the muffler, but mechanical and physiological features, as noted in paragraph six, must be corrected for the diver's safety."

3. Elaborating comments from a discussion between LTJG R. C. KEMPER, USNR, who was in charge of subject tests, and the Project Officer, EDU, follows:

(a) Most of the dives involved were to a depth of 40 ft., at which level the mines were located. Some dives were to the bottom (80 ft.) to check hydrophones and tools.

(b) Work involved was considered "moderate-to-heavy". Subjects were placed in water at a descending line near the mine's location and they then vigorously pulled themselves down (hand-over-hand) while kicking. It was then usually necessary to swim about looking for the mine. The current was less than a knot (estimated) but there was a heavy bottom wash making it necessary to hang on to the mine to work.

(c) There were no dramatic symptoms of CO_2 buildup experienced. During the initial dives, there were 3 or 4 complaints of slight headache attributed at the time to the strain involved in exhaling against the higher resistance. These headaches were of about 30 minutes in duration. These complaints stopped with more experience on the part of the subjects (11 subjects involved), but it is questionable whether this was because of acclimatization to the increased resistance or whether the men began to partially exhale out the side of the mouthpiece to avoid the back pressure. The latter condition is held to be the case by LTJG KEMPER and most subjects.

(d) Of the two dives which are reported in "6(d)" above as having been terminated, both were to 40 ft. only. One of the dives was by LTJG KEMPER during which there was difficulty in finding the mine and vigorous swimming was required. He noticed onset of a headache, suspected CO_2 buildup and surfaced. The headache lasted about 30 minutes.

(e) The other terminated dive was as a result of a flooded exhalation tube and the inability to clear it through the muffler. A faulty regulator was suspected.

4. The results of this field trial are considered to further confirm the earlier results reported in Evaluation Report 01-59 and to substantiate the recommendations.

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It is further borne out that the muffler should only be used for light work and that subjects should be on guard for CO_2 buildup. The need of a lower resistance evice is evident; however, short of this, it is reemphasized that a means is needed whereby the swimmer could cut-out the muffler during the vigorous approach period and cut it in when near or working on a mine.

5. Though not previously considered for the muffler, the case of the flooded exhaust tube and inability to clear through the KEL-F material points up the possible need of a water dump capability in the muffler barrel similar to that in the AiResearch Corp. noise suppressor's dash pot.

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Project Officer

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ABSTRACT

Three commercially available, Swiss made, submersible wrist watches, Rolex, Blancpain and Enicar, are comparatively evaluated and in turn are compared with the still-under-development standard USN watch (Bulova). Specific features of the Swiss watches (strap and second hand) are recommended for inclusion in the USN watch. The Rolex watch is found to be not sufficiently waterproof, bearing out reports from the field and is recommended for deletion from the Navy's approved list. The very cheap, but without rotatable ring, Enicar watch is found to be satisfactory, again bearing out reports from the field, and its inclusion on the approved list is recommended.

SUMMARY

PROBLEM

Make a comparative evaluation of three commercially available, Swiss made, submersible wrist watches and to further compare them to the previously evaluated standard U.S. Navy submersible wrist watch.

FINDINGS

Of the two commercial watches currently listed in BuShips Notice 10510.3 of 4 December 1957 as acceptable, the Rolex is not watertight, its rotatable ring is unsatisfactory and its expensive expandable strap is definitely not desired. The Blancpain watch is cheaper and in all respects preferred.

A third watch, the Enicar, without a rotatable ring, and much cheaper, was found to be satisfactory except for a shiny case (as also on the Rolex).

The single band, nylon strap with conventional buckle as furnished on the Blancpain and as previously recommended for the standard USN watch was found to be superior.

The wider second hand as on the Enicar and as previously recommended for the standard USN watch was found to be superior.

RECOMMENDATIONS

It is recommended that:

(a) The Rolex be deleted from the above BuShips Notice.

(b) That the Enicar be added to the BuShips Notice and that steps be taken to have it supplied in a dull case.

(c) That the BuShips Notice be modified to indicate watches with and without rotatable rings and with and without shiny cases.

(d) That the Blancpain-type strap be adopted on the USN standard watch.

(e) That the Enicar-type of wider second hand be adopted on the USN standard watch.

ADMINISTRATIVE INFORMATION

Bureau of Ships contract specification, SHIPS-W-2181 of 5 December 1955 entitled "Wrist Watch, Submersible", has been issued to cover the development and testing of wrist watches for use by underwater swimmers and divers. The Bulova Corp. has, under BuShips contract, been active in the development of a watch to meet this specification and preproduction samples have been tested at the Experimental Diving Unit on three occasions as reported in EDU Evaluation Reports 5-58 and 7-58.

Pending the development and acceptance of a satisfactory U.S. Navy Submersible Wrist Watch under the above contract, Bureau of Ships Notice 10510.3 of 4 December 1957 authorized fleet activities to purchase either the Rolex or the Blancpain watches for interim use. In view of this interim authorization, a sample of each of the two models was purchased on the open market and tested in a manner similar to the Bulova watch to investigate conformance to the contract specification. Unofficial correspondence from fleet activities indicated that several ENICAR "Seapearl 600" Submersible Wrist Watches were being used with good results and so a sample of this watch was also purchased on the open market and evaluated.

Work at the Experimental Diving Unit was performed under the continuing project NS186-200, Subtask 4, Test 43 entitled "Miscellaneous Swimmer's Auxiliary Equpment." Charges incurred were lodged against allotment 16102/58. All watches were procured through open purchase on a proprietory basis.

Magnetic signature testing, shock testing and accuracy checks (other than subjective) as called for in the specification have not been carried out by the Experimental Diving Unit, and will, if required, be performed elsewhere at the direction of the Bureau of Ships.

C. M. Prickett, GM1(DV), USN was designated as Project Engineer and LCDR W. F. Searle, Jr., USN as Project Officer. Runs on the Rolex and Blancpain watches were performed during the period 17 March to 22 April. Runs on the Enicar watch, which was purchased later, were performed between 20 May and 8 July.

The following breakdown indicates the manpower expended on this project:

DESCRIPTION	MANHOURS
Depth Runs (chamber)	10
Subjective working dives	58
Luminosity tests	8
River runs	8
Report preparation	10
Clerical services	10
TOTAL	104

The three watches tested have been retained at the Experimental Diving Unit and are being used on a day to day basis. If the Bureau of Ships desires additional testing (magnetic, shock, accuracy, etc.) they are available for shipment as directed.

This report is issued in the evaluation report series and is distributed only by the Bureau of Ships. The information concerning a specific brand of watch is Confidential in nature and under no circumstance should it be revealed except by the Bureau of Ships.

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1. OBJECT

1.1 Objectives

1.1.1 The object of this project has been to evaluate open-purchase samples of three commercial submersible wrist watches to determine their conformance to BuShips Contract Specification SHIPS-W-2181, of 5 December 1955.

1.2 Scope

1.2.1 This report covers those tests in the specification concerning watertightness at depth and luminosity. General subjective testing is also included. Tests of the time-keeping accuracy, the magnetic signature and shock resistance have not been performed.

1.2.2 Though not covered by the specification, a test has also been included of the tendency of the outer, rotatable ring to clog and become inoperable when working in sand or silt.

1.3 Background

1.3.1 Pending development of a standard U.S. Navy Submersible Wrist Watch, the Rolex and Blancpain watches have been authorized for interim use. Several diving activities report using also the Enicar watch. The Standard USN watch is being developed by the Bulova Corp. and preproduction samples have been evaluated by EDU and reported on on two previous occasions as follows:

Evaluation Report 5-58; Bulova Wrist Watch Submersible: 10 March 1958.

Evaluation Report 7-58; Bulova Wrist Watch, Submersible (II); 7 May 1958.

2. DESCRIPTION

2.1 Watches

2.1.1 A general description of the three watches tested follows:

2.1.2 Rolex

a.	Manufacturer:	The Rolex Watch Co., Ltd., Geneva, Switzerland
b.	Distributor:	American Rolex Watch Corp., 580 Fifth Ave., New York 36, New York.
c.	Price:	$90.00 (includes expandable strap)
d.	Identification:	"Submariner, Model 5508" "[illegible]" "[illegible]"
e.	Serial:	Watch #307271

f. Weight (excluding strap): Dry 2.25 oz.
Submerged 1.75 oz.

g. Size: Case 1 13/16 x 1 1/2 inches
9/16 inches thick
Face 1 3/16 inches diameter

h. Face: Black background; luminous hour and minute markings; no numerals except on rotatable bezel ring; sweep second hand.

i. Bezel ring: Knurled, tapered bezel ring with numerals each 10 minute mark.

j. Moisture Indicator: None

k. Stem arrangement: Conventional location; seals by screwing cap in against spring and seal.

l. Strap: Heavy, stainless steel, expandable closed strap with folding, snap-type catch.

m. Manufacturer's Instructions: "Every year to 18 months take your watch to an official Rolex servicing agent for oiling and cleaning, and if it is an Oyster, a waterproof check."

"Your Rolex Oyster is equipped with the new patented Rolex Twinlock crown. Normal wearing position of this crown should be the locked position--it may be opened, however, for winding or setting. Although your Oyster remains waterproof regardless of the position of the crown, it is recommended that the crown be screwed firmly into locked position when watch is worn."

2.1.3 Blancpain

a. Manufacturer: Swiss movement. Specific manufacturer not identified.

b. Distributor: Allen V. Tornek Co., 75 West 45th St., New York, 36, New York.

c. Price: $55.50

d. Identification: "Blancpain Fifty Fathoms"
"Automatic"
"MILSPEC I"

e.	Serial:	Watch #1595
f.	Weight (excluding strap)	Dry 2.5 oz. Submerged 2.0 oz.
g.	Size:	Case 2 x 1 5/8 inches 1/2 inch thick Face 1 1/8 inches diameter
h.	Face:	Black background; luminous hour and minute markings; no numerals except on rotatable bezel ring; sweep second hand.
i.	Bezel ring:	Knurled flat bezellring with numerals at 15, 30 and 45.
j.	Moisture:	Circular, conventional blue-pink moisture indicator at six o'clock.
j.	Stem arrangement:	Conventional location, very small knob, pull out to set, no sealing cap, self winding watch.
l.	Strap:	Nylon strap nine inches long sliding across back of case and under strap pins; conventional buckle.
m.	Manufacturer's instructions:	An instruction sheet specifically for the watch purchased was furnished by the distributor and is included in this report as Appendix A.

2.1.4 Enicar

a.	Manufacturer:	Enicar Watch Factory, Lengnau, Switzerland
b.	Distributor:	Enicar Watch Corp., 681 Fifth Avenue, New York 22, N.Y.
c.	Price:	$25.00
d.	Identification:	"Enicar Ultrasonic"
e.	Serial:	Watch #98243
f.	Weight (including strap):	Dry 1.5 oz. Submerged 1.0 oz.
g.	Size:	Case 1 3/4 x 1 7/16 inches 7/16 inches thick Face 1 3/16 inches diameter
h.	Face:	Black background; luminous hour and minute markings; numerals at 3, 6, 9 and 12 are non-luminous within luminous squares; sweep second hand.

i. Bezel ring: None

j. Moisture indicator: None

k. Stem arrangement: Conventional; no external seal arrangement: pull out to set.

l. Strap: Soft, very slightly elastic plastic strap with conventional buckle.

m. Manufacturer's Instructions: "Your Seapearl 600 has been tested under water pressure equivalent to 60 feet of water - - - . Provided you comply with instructions - - -, we assume full responsibility for any mechanical defects which might develop during the period of one year."

"Because of the special ultrasonic treatment which this watch has undergone, it is not necessary to clean or oil it for a period of 3 years."

"If Seapearl 600 is to be used for diving, it is essential that stem, crown and crystal are replaced once a year at nominal charge."

2.2 Contract Specification

2.2.1 For purposes of comparison and in order to describe the qualities desired in a standard U.S. Navy submersible wrist watch, pertinent paragraphs from BuShips Contract Specification SHIPS-W-2181 of 5 December 1955 are quoted as follows:

(1) Watertightness

"3.6.1 Requirements, Case, General.

- - The case and crystal assembly shall be sealed and sufficiently rigid to withstand a hydrostatic pressure of 175 pounds per square inch (gage) with no leakage and no deformation which might interfere with the proper functioning of the movement. A moisture vapor sensitive test will be used to detect leakage. - - .

"3.9 Requirements, Moisture Indicator.

A moisture indicator shall be securely fastened to the dial in a visible location. The free rotation of the hands shall not be affected when the indicator is in place. - - .

"4.3.6 Inspection Tests, Watertightness Test.

Each watch shall be thoroughly dried and sealed at atmospheric pressure with its moisture indicator distinctly showing a deep blue portion and a pink portion. The ambient temperature during this test shall be 75° F ± 10°F. Each watch shall then be placed in the pressure vessel in any position and surrounded with water at a pressure of 175 pounds per square inch (gage) ± 5 psi for 1 hour ± 5 minutes. The watch shall then be removed from the pressure vessel and allowed to sit in the open air for 2 hours ± 10 minutes. It shall then be visually examined for any evidence of water penetration. Any watch whose moisture indicator is no longer clearly divided into a blue portion and a pink portion shall be rejected.

"6.1 Notes, General material.

- - A watch which is impervious to the entrance of water vapor for periods of many months is highly desirable."

(2) Visibility in dark

"3.7.1 Requirements, Dials and Hands, General

Readability of this watch is of primary importance. It shall be able to be read in total darkness. Care shall be taken to ensure that all markings are sharp edged, clean and readily distinguishable from other remote and adjacent marks.

"3.7.4 Requirements, Dials and Hands.

- - The three hands shall be distinctly different from each other and shall clearly stand out from the dial background when viewed in either natural daylight conditions or in total darkness."

(3) Outer, rotatable ring

"3.6.6 Requirements, Case, Rotatable Ring.

The watch shall be equipped with a rotatable ring in the location normally occupied by the bezel. - - In use, the ring will be rotated to line up the index mark with one of the hands. - - - - The ring shall be designed to be rotated and set by hand without tools and shall be protected against unintentional movement caused by abrasion, shock and vibration."

3. PROCEDURE AND RESULTS

3.1 Depth Runs

3.1.1 Watertightness and depth runs on the watches were conducted as described in Evaluation Reports 5-58 and 7-58, suspending the watch in a beaker

of water in a recompression chamber, first in a vertical and then in a horizontal position, during the 392 foot runs and then wearing the watch during numerous working dives to random depths. Indication of leakage, either by indicator color changes or accumulation of moisture on the face, was carefully observed.

3.1.2 The three watches tested are fully identified in part 2. They all ran satisfactorily both before and after the tests. None of the three watches showed droplets or moisture after the tests. However, the Blancpain which is the only one of the three which has a color indicator, indicated moisture after the tests. The Rolex by mid-July, as this report is written, and approximately two months after formal testing was completed, is beginning to be foggy inside the crystal. The watch has been worn during numerous working dives over the intervening period. The color indicator in the Blancpain which has also been worn dialy, is (by mid-July) completely changed, being indistinguishable from the control color, however, there is no fogging in the case.

3.1.3 The water temperature in the beakers in which the watches were tested was maintained at approximately 75°F.

3.1.4 The results of the test of each watch, presented chronologically is as follows:

(1) Rolex

17 March 1958 through 22 April 1958	Made 65 test working dives of from 68 ft. to 200 ft. Total time in water 53 hours.	Watch still running and shows very slight fogging by 22 April.
22 April 1958	Test run #1. Vertical, 1 hour at 392 ft.	No additional moisture evident, No bubbles during ascent. Watch running.
23 April 1958	Test run #2. Horizontal, face down. 1 hour at 392 ft.	No additional moisture evident. No bubbles during ascent. Watch running.
28 April 1958	Made river run in 18 ft. of water. Working watch in and out of sand and mud.	Watch running. Bezel ring too hard to turn.
14 July 1958	Runs after 28 April not logged but at least two per week to 200 ft. were performed.	Excessive fogging on underside of crystal. Watch still running accurately.

(2) Blancpain

17 March 1958 through 22 April 1958	Made 65 test working dives of from 68 ft. to 200 ft. Total time in water 53 hours.	Watch still running. Moisture color indicator shows slight color change at latter part of tests.
22 April 1958	Test run #1. Vertical, 1 hour at 392 ft.	No moisture evident. No bubbles during ascent. Watch running. Slight additional color change.
23 April 1958	Test run #2. Horizontal, face down. 1 hour at 392 ft.	No moisture evident. No bubbles during ascent. Watch running. Medium color change.
28 April 1958	Made river run in 18 ft. of water. Working watch in and out of sand and mud.	Watch running. Bezel ring easy to turn. Medium color change. No moisture evident.
14 July 1958	Runs after 28 April not logged but at least two per week to 200 ft. were made.	Indicator has completely changed color, but no moisture is evident. Watch still running accurately.

(3) Enicar

29 May 1958 through 30 June 1958	Made 19 test working dives from 90 ft. to 200 ft. Total time of watch in water 11 hours.	Watch still running. No bubbles observed on any dives. No evidence of moisture.
3 June 1958	Test run #1, vertical, 1 hour at 392 ft.	No bubbles during ascent. Watch running.
4 June 1958	Test run #2. Horizontal, face down, 1 hour at 392 ft.	No bubbles during ascent. Watch running, no fog. No evidence of moisture.
14 July 1958	Runs after 4 June not logged but at least two per week have made to 200 ft.	No moisture evident. Watch still running. accurately.

3.2 Luminosity Tests

3.2.1 Luminoisity tests of the three watches were performed as described in Evaluation Report 5-58 using the same three subjects for each watch. The men were placed in a completely darkened recompression chamber (dry) and then in a completely darkened tank and instructed to observe the readability of the watches' hands, face and bezel ring.

3.2.2 Results of the luminosity tests are as follows:

(1) Rolex

Both in and out of water, the watch could be fully read including second hand and bezel ring at about 12 inches from the eyes. The watch could be read sufficiently well to tell time at 18 inches from the eyes, however, at this distance the second hand could not be read.

(2) Blancpain

Same comments as Rolex.

(3) Enicar

In a dry chamber, the watch could be fully read, including the second hand (there is no bezel ring), at 18 inches from the eye. Underwater, the watch could be fully read at 8 inches, including second hand.

3.3 Bezel Ring Adjustment

3.3.1 Working dives in mud, sand and silt were performed, similar to those described in Evaluation Report 5-58, in order to check the tendency of the bezel ring to jam and to test the ability of the swimmer to adjust the ring underwater. Rubber swimmers gloves were worn.

3.3.2 Results of the tests of the bezel ring were as follows:

(1) Rolex

In sand and mud, the ring became jammed far more quickly than the other watches (Bulova or Blancpain). The beveled edge of the bezel ring makes it difficult to grip and turn the ring even in clear, fresh water without gloves. In an operational condition with gloves on and cold fingers, the ring can not be rotated at all.

(2) Blancpain

There was no tendency for the ring to jam. The sharp, knurled edge of the ring makes it the easiest of the three watches (Bulova and Rolex) to turn.

(3) Enicar

This watch does not have a rotatable bezel ring.

4. DISCUSSION

4.1 Watertightness

4.1.1 Of the three watches tested in this report, the Enicar and Blancpain appear to be watertight. This bears out unofficial reports from the field and observations of EDU personnel while on field trips. The Blancpain, in which the color indicator has completely changed, still runs accurately and shows absolutely no evidence of moisture on the face or underside of the crystal. This change in color in the indicator over a long period of time seems to be a general characteristic of all such moisture indicators (as in the Bulova watch and in the obsolescent USN submersible wrist watch, FSN G6645-243-9181) and since neither the Rolex nor Enicar have an indicator, the Blancpain is not marked down by virtue of it. So far as this test is concerned there appears no preference between Enicar and Blancpain and in turn, they both compare with the Bulova.

4.1.2 The Rolex tested, though still running accurately, is quite fogged on the underside of the crystal and is somewhat difficult to read. There are no significant droplets on the face or crystal and the watch is certainly not flooded. The fact that the watch still runs is not indicative of water-proofness as borne out by the fact that several of the Bulova watches, during the initial tests, completely flooded but continued to run. This excessive fogging on the underside of the crystal is similar to that noted on other Rolex watches in the field.

4.2 Luminosity

4.2.1 All three of the watches appear to be equally satisfactory so far as luminosity is concerned and they all compare favorably with the Bulova which, except for the second hand, may be very slightly more luminous. The Enicar's face is rather gaudy and strange looking with such large areas of luminous material but it is quite readable. The Enicar's somewhat wider second hand is significant in that it is the only second hand which is readily readable. Recommendation 5.2 of Evaluation Report 5-58 recommended that the Bulova's"second hand be made slightly wider to improve its readability in darkness." The Enicar's second hand demonstrates this recommendation.

4.3 Bezel Ring

4.3.1 The Blancpain's bezel ring turned at least as easily and perhaps slightly easier than the Bulova. Both the Blancpain and Bulova are considered satisfactory in this respect and neither of them has a tendency to jam. The Rolex's bezel ring is tapered outward and the knurls are not sharp and consequently it is difficult to grip and turn out of the water with bare hands and nearly impossible to adjust underwater with or without gloves. In this respect, the Bulova is not considered satisfactory.

4.3.2 The Enicar watch, as previously noted does not have a rotatable ring.

4.4 Strap

4.4.1 In the discussion of the Bulova watch in Evaluation Report 5-58, paragraphs 4.4.2 and 5.2.3, it was noted that the strap was not considered adequate. The strap on the Rolex watch is an expensive, expandable metal strap with a folding clip-type snap. The band being metal no doubt adds to the magnetic signature problem and also to the weight. The snap is quite prone to opening. There was general agreement that such a fancy strap was not needed; in fact it is quite undesirable. The metal band and strap also might pinch a rubber suit. There is no justification for the added cost (ten to fifteen dollars) of this strap and field activities purchasing the Rolex would do well to specify a simple nylon or plastic strap. It is understood that commercial, non-watertight Rolex watches come with this metal strap optional.

4.4.2 The Blancpain's strap is a single nylon band with conventional buckle, the band passing beneath the case. It is this type strap which was intended in the recommendation in paragraph 5.2.3 of Evaluation Report 5-58. The Enicar's strap is a soft plastic, slightly elastic (in two pieces) with conventional buckle. This strap too is satisfactory though should be longer to permit use over an exposure suit. The blancpain type is preferred to all four types considered.

4.5 General

4.5.1 The comments of paragraph 4.4.3 and 4.4.4 of Evaluation Report 5-58 concerning the location of the stem and the ability to wind or set the watches underwater, apply equally well to the Rolex, Blancpain and Enicar watches.

4.5.2 A comparison of the cost of the three watches here under evaluation ($90.00, $55.50 and $25.00) is significant. Even deducting, as a maximum, $15,00 for the Rolex's expandable strap and considering its poor showing on watertightness and its rotatable ring, it would appear, within the range of this evaluation, that the Blancpain is a better buy for a watch which includes a rotatable outer ring. For uses where the rotatable outer ring is not a necessity, the very much cheaper Enicar, at $25.00 is by far the best buy. At $25.00 per watch, the forces in the field could well use the watches a year and discard them, since it is understood that the cost of repair (at Norfolk Naval Shipyard) of existing types is above $25.00, not including supply and other administrative hidden charges. A cost figure for the Bulova watch is not as yet available.

4.5.3 From a subjective standpoint, the diver subjects were as one in complaining of the Rolex's strap. They further considered it too heavy. Preference was about equally divided between Blancpain and Enicar until subjects were appraised of the cost, after which all subjects indicated preference for the Enicar.

4.5.4 A subjective comment, worthy of note is the general objection to the Rolex and Enicar on account of their shiny finish. Subjects felt that these watch cases, if worn in tropical waters, might attract fish, in particular sharks and barracuda. In this respect the Blancpain, with a dull case (as on the Bulova) is preferred.

5. CONCLUSIONS

5.1 Conclusions

5.1.1 It is concluded that the Rolex watch is not, by comparison with other watches available, a good buy. It is not sufficiently waterproof, its rotatable ring is not easily rotatable and the cost, even excluding the strap, is significantly higher.

5.1.2 It is concluded that both the Blancpain and the Enicar watches are satisfactory submersible wrist watches for interim use. If a rotatable ring is required, the Blancpain is called for. If the rotatable ring is not required, either watch is satisfactory, the Enicar being cheaper. Considering the objection to the Enicar's shiny case, the Blancpain is concluded to be preferable. Perhaps, however, the Enicar could be procured in a dull case.

5.1.3 It is concluded that the single band, nylon strap with conventional buckle as on the Blancpain is most desirable. The expensive, expandable metal strap with folding catch as on the Rolex is definitely not desirable.

5.2 Recommendations

5.2.1 It is recommended that BuShips Notice 10510.3 of 4 December 1957 be modified to delete the Rolex Submariner, Model 6538. If this recommendation is not acceptable to the Bureau, at least the forces in the field should be instructed to purchase the watch without the expandable band.

5.2.2 It is recommended that BuShips Notice 10510.3 be modified to add the Enicar watch, noting that it should be purchased for uses where the rotatable ring is not a necessity. If this recommendation is accepted, it is further recommended that the manufacturer be requested to furnish the watch in a dull case.

5.2.3 It is recommended that BuShips Notice 10510.3 indicate that the Enicar and the Rolex (if it is retained on the acceptable list) have bright cases and should not be used in tropical waters where biting fish abide.

5.2.4 It is recommended that the standard U.S. Navy submersible wrist watch have a wider second hand, similar to that on the Enicar, bearing out recommendation 5.2.2 of Evaluation Report 5-58.

5.2.5 It is recommended that a watch strap as found on the Blancpain be accepted as standard on the U.S. Navy submersible wrist watch, bearing out recommendation 5.2.3 of Evaluation Report 5-58.

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BUSHIPS 10510.3
Ser 565-4732
4 December 1957

BUSHIPS INSTRUCTION 10510.3

From: Chief, Bureau of Ships
To: Distribution List

Subj: Procurement of Interim Submersible Wrist Watch

Ref: (a) BUSHIPS INSTRUCTION 10510.2A of 26 April 1957 on repiar of Submersible Wrist Watches

1. Purpose. The purpose of this instruction is to promulgate instructions for local procurement of an interim Submersible Wrist Watch as a replacement for wrist watch, Federal Stock G6645-243-9181.

2. Background.

a. The existing submersible wrist watch, FSN G6645-243-9181 is an obsolescent item which is being removed from the Navy Stock List of General Stores. The Military replacement for this watch is undergoing evaluation but is not expected to be available in the Navy Supply System until calendar 1959.

b. To meet interim requirements for a submersible watch, the Bureau of Ships has evaluated several commercial models. Of those evaluated, only the following watches, which passed most of the major test requirements of the submersible wrist watch draft specification, are considered acceptable for interim use:

Make:	Blancpain Fifty Fathom	Rolex Submarine, Model 6538
Distributor:	Allen V. Tornek Company 75 West 45th Street New York 36, New York	American Rolex Watch Corp. 580 Fifth Avenue New York 36, New York
Price to U.S. Gov't. Activities:	$55.50	$90.00

c. While the above watches are the only known acceptable substitutes tested to date, other satisfactory commercial models which may come to the attention of the Bureau will be included in revisions to this instruction.

3. Policy.

a. Until a satisfactory submersible wrist watch is available in the Navy Supply System, using activities having a requirement for submersible watches which cannot be met by repair of existing watches in accordance with reference (a), are authorized to make local procurement of the commercial submersible watches noted above, in the quantity required for immediate operations.

b. Stocking of commercial watches or repair parts for them is not authorized.

c. Commercial submersible watches may be repaired by the original vendor or by the Norfolk and Long Beach Naval Shipyard.

d. Addresses are requested to recommend to the Bureau of Ships any other commercial watch which appears to be a satisfactory interim substitute for the existing item.

4. Effective date. This instruction is effective upon receipt.

/s/ W. A. BROCKETT
W. A. BROCKETT
By direction

APPENDIX "A"

APPENDIX "B"

INSTRUCTION SHEET

BLANCPAIN FIFTY FATHOMS AUTOMATIC MIL-SPEC

This Military Specifications model of the BLANCPAIN FIFTY FATHOMS AUTOMATIC was designed to meet the most rigorous military requirements. It is specially constructed to withstand water pressure to a depth of 600 feet.

EXCLUSIVE SYNCHRONIZATION FEATURE

An exclusive feature of the BLANCPAIN FIFTY FATHOMS AUTOMATIC MIL-SPEC enables it to be stopped for exact second-by-second synchr nization. If you wish to synchronize the second hand exactly with a master clock, you can stop the hand merely by pulling out the winding crown. The second hand will start instantly when the crown is pushed back to normal position.

WARNING INDICATOR

The BLANCPAIN FIFTY FATHOMS AUTOMATIC MIL-SPEC is the only watch with a positive indication of permanent water-tight protection. Note the pink and blue warning indicator on the face of the dial. As long as the blue area remains blue, you can be sure no moisture or humidity has entered the watch. If any moisture should enter the case, because of mistreatment or any defect in water-tight protection, the blue area will turn pink.

WARNING

To be sure of absolute water-tight protection, this watch should not be opened except by an authorized BLANCPAIN watchmaker, or by the BLANCPAIN agency, at 75 West 45th St., New York 36, N.Y.

Watch No. 1595 has been checked, timed, and tested in water pressure equal to a depth of 450 feet, at our testing laboratory at the above address.

All communications and inquiries should be directed to: -

ALLEN V. TORNEK CO.
75 West 45th STREET
NEW YORK 36, NEW YORK

Telephone: - CIrcle 6-2698 and 2699.